

Now, with the opportunity to visit this monument in the grand park at Spring Mill, we, the public, are pleased to have a share in attesting our admiration for both the nature-loving men, Donaldson and Wilson, whose names are linked with this unique tribute in stone.

INDIANAPOLIS, IND.

THE 1937 WATERFOWL SEASON IN THE PRINCE ALBERT DISTRICT, CENTRAL SASKATCHEWAN.

BY O. C. FURNISS

The 1937 waterfowl season in the Prince Albert district has been far less favorable than those of former seasons. A remarkable decline in the number of broods has taken place even though conditions earlier in the year indicated that a successful season could be expected. Water levels reached their lowest in the fifteen years of observations carried on by the writer and in the lifetime experience of the oldest settlers.

The information in this paper is based on observations carried on during the migration, breeding, and post-breeding seasons on eighty-three sloughs and potholes south of the city. It does not pretend to be exhaustive, but may serve to show the influence of certain factors and the general trend of conditions as they exist in this area.

LOCALITY

The Prince Albert district is on the dividing line between the typical Canadian and Transition Life Zones; and consists of rolling well-wooded country, the characteristic trees being aspens and willows, with numerous small sloughs and potholes. It is adapted to mixed farming and has been settled for the past fifty years. The area has a creek flowing through the middle of it which helped to maintain the level of some of the sloughs much longer than would otherwise have been the case. The locality may be considered as being very favorable for breeding waterfowl.

WATER LEVELS

The water levels in the sloughs in this area depend for the maintenance of their levels upon spring run-off. The amount of water received from rainfall in the summer season does not make up for that lost by evaporation, a poor spring run-off lowers the levels. There has been a tendency toward lower levels for several seasons in the sloughs studied in this paper, but no sudden lowering was noted until the summer of 1936. The first survey of broods was made in 1934 when the area was mapped and the work started; levels at that time

were considered normal. Since the summer of 1934 many sloughs have disappeared except for a short time in the early spring, due to the very dry and hot summers of 1936 and 1937 and poor run-off from spring thaws.

The amount of spring run-off will vary with the snowfall and the coming of warm weather. Early thaws during late February and early March will cause the upper crust of the snow to soften and increase in density. When the total layer of snow has "packed" or increased in density, there will be a run-off at lower temperatures. This spell of warm weather never lasts beyond a few days but the result is always a poor run-off unless there is an added snowfall. When early thaws occur and the snow has become "packed", the winds during March evaporate much of the moisture from the snow even though the temperature may be sufficiently low to prevent any actual run-off. This happened during the springs of 1936 and 1937 and the result has been a tremendous lowering of water levels in this and adjacent areas. If the levels of the eighty-three sloughs and potholes studied were considered to be about normal during 1934, then there has been a complete drying up of at least fifty per cent and, with many, such a change in growth that a stranger would never realize that such places two and three years ago contained sufficient water to encourage Canvas-backs to nest and successfully raise their young.

In 1934 the eighty-three sloughs and potholes in the area contained water throughout the year or until late summer; this year (1937) all had some water during the early spring. Fourteen of these may be classified as "rest" sloughs, that is, while they provided plenty of food and were above average for the district in size, the surrounding cover offered no inducement for the concealment of nests. Large numbers of ducks could be noted on them at all times resting or feeding. During July, 1934, none of these sloughs was over twelve acres, the area being estimated by the amount of open water. Graph 1 shows the normal area in 1934 and the number and size of the sloughs. The decrease in size and number took place so rapidly during July in 1936 and 1937 that it would be impossible to list them in any graph.

NESTING COVER

The cover around the sloughs was listed as "good", "fair", and "poor", from the viewpoint of providing effective concealment for nests. Those listed as "good" had a heavy stand of *Typha latifolia* or *Scirpus validus* in the water and a heavy land cover such as *Scolochloa festucacea*. Those listed as "fair" had either a good stand of cover in the water and none on the land or vice versa. Those listed as "poor"

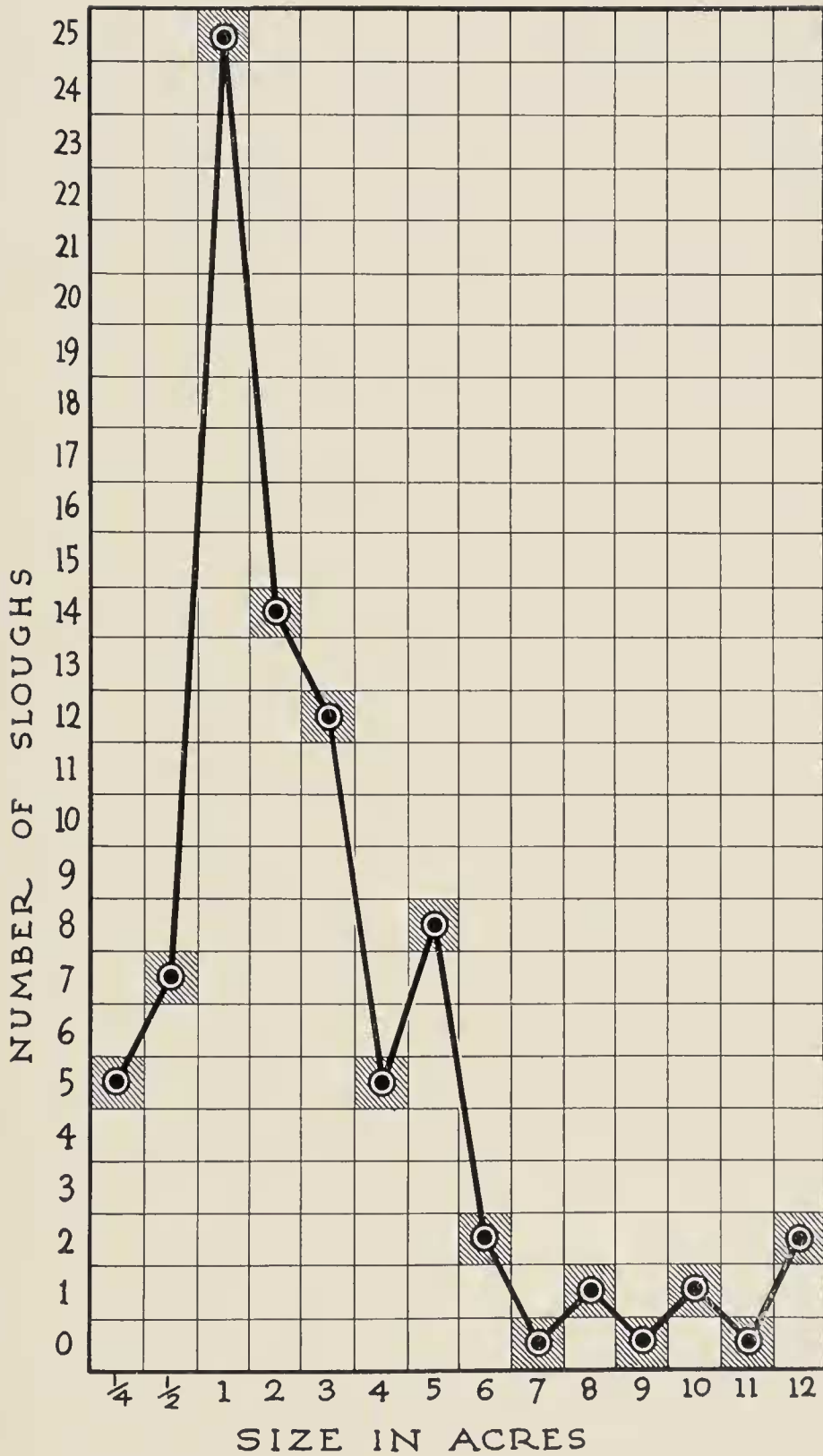


FIG. 8. Graph No. 1, showing the number and size of the bodies of water examined in 1934. Vertical scale indicates the number of sloughs; the horizontal scale, the size in acres.

were deficient in both types, or the growth was so slight that it could not be considered effective in nest concealment.

In many instances those sloughs listed as "fair" had had the land cover destroyed by:

1. Grazing by livestock.
2. Burning by farmers.
3. Mowing for hay the previous summer.

The first two factors are particularly destructive to nesting cover especially for those species of ducks that nest on the uplands. Grazing destroys every vestige of cover on the edges and during dry seasons stock also break down the heavier stands of *Typha* or *Scirpus* in the water. If there has been a dry spring, stock wade through these stands of cover and destroy nests of such species as the Canvas-back and Redhead. Fire destroys mainly the land cover, but if the growth in the water is heavily lodged it will destroy it also. Mowing the land cover does not have the same direct effect; the haying season does not take place until well into July when most species have completed nesting, and if the cover is inadequate next spring, the birds will have a tendency to nest elsewhere.

The sloughs in the area were classified as follows:

COVER GOOD		COVER FAIR		COVER POOR	
No.	Per Cent	No.	Per Cent	No.	Per Cent
22	26.50	42	50.60	19	22.90

Typha latifolia and *Scirpus validus* are the most common cover plants found in the sloughs in this district. Other aquatic plants occur such as various species of *Carex* and in a few sloughs small stands of *Scirpus americanus* may be found. The most common cover on the land edges of the sloughs is *Scolochloa festucacea*, a few sloughs have *Hordeum jubatum* and *Agrostis hiemalis*. *Typha latifolia*, *Scirpus validus*, and *Scolochloa festucacea* are the three most common plants and provide the best growth for effective nest concealment.

During the last two summers these rings of vegetation have been drawing gradually toward the centers of the sloughs as the levels dropped. This fact has given to the casual observer a mistaken idea as to the actual trend of levels and conditions. The layman, in the spring, sees the run-off well up and past last season's growth of *Typha* and the impression is one of good water conditions. If a careful note is taken, it will be found that there are other seasons' growth higher up on the shore to which the run-off never reaches and has not done for several years.

FOOD PLANTS

Food plants were noted as being common and ample food was found in all the sloughs examined. *Potamogeton* was very abundant particularly in the rest sloughs. *P. pectinatus* was the most common species although *P. pusillus* and *P. richardsonii* were also present. *Sagittaria latifolia*, *Ranunculus aquatilis*, *Lemma minor*, *Eleocharis palustris*, and *Sparganium eurycarpum* were the most common foods after the *Potamogetons*. *Ruppia occidentalis* was found in one slough.

OBSERVATIONS ON WATERFOWL: METHODS

The area under observation consisted of twenty quarter-sections; and in order to arrive at comparable data on sex ratio and specific abundance the territory was divided into twenty divisions of one quarter-section each. Each division was covered once a week. A map of the whole area was drawn and the sloughs and potholes listed and numbered. A time-table was followed so that each division received the same attention and was examined the same time each week. In each inspection all the ducks on every slough, in the quarter-section to be visited, were listed specifically, sexually, and according to numbers. Ducks noted on adjacent areas were not listed until the time came to study that area. Some of the surface feeders flew up and there was the possibility that they settled on the next slough to be covered. When in the opinion of the observer such was the case, due allowance was made. However, this did not frequently happen as they usually flew to another area. Also out of a total of eighty-three sloughs and potholes it was most unlikely that they would fly to the next particular slough to be visited.

The nests of any ducks that were found were carefully noted as to position, concealment, number of eggs, proximity of possible predators, and numbered. A history of each nest was kept in an effort to arrive at the percentage of hatch for the whole area. Late in July a brood count was taken for comparison with other years.

SPRING MIGRATION

The earliest ducks to arrive in the spring reach here about the third week in April, depending upon the amount of open water, and are usually Mallards, Pintails, and some of the mergansers which, however, pass on as open water appears farther north. By the first of May the bulk of the migrants has arrived with the exception of the Blue-winged Teals, Shovellers, and Ruddy Ducks which increase daily. The White-winged Scoter, the last arrival, does not arrive until about May 21 and does not remain to breed but passes on to larger bodies of water.

BREEDING SEASON POPULATION

During the seasons 1935 and 1936 the census to determine the relative and specific abundance, as well as the sex ratio, of the ducks in the area under observation was started on April 27 and followed through until May 17. During the present year (1937) the count was started on May 2 and followed through until May 23. At the termination of this period Mallards, Pintails, and Canvas-backs were nesting in numbers and if the count had been continued would have shown an overwhelming excess of males over females. The work was started a little later this year because during the first two seasons the relative standings of such late arriving species as the Blue-winged Teal and Shoveller could not be determined. Tables 1 and 2 show the results obtained for the season 1937 and the average for the two previous seasons of 1935 and 1936.

TABLE 1. The average breeding season populations for the two seasons 1935 and 1936 as estimated from counts taken from April 27 until May 17.

Species	Total	Males	Females	Ratio of males to females
Mallard	120.5	73	47.5	1.53—1
Cadwall	3.5	2	1.5	1.33—1
Widgeon	37.5	20	17.5	1.12—1
Green-winged Teal.....	26.5	14.5	12	1.20—1
Blue-winged Teal.....	58	33.5	24.5	1.37—1
Shoveller	15	8	7	1.14—1
Pintail	41.5	32	9.5	3.36—1
Redhead	37	20.5	16.5	1.24—1
Canvas-back	127	70	57	1.40—1
Lesser Scaup.....	437.5	266.5	171	1.41—1
Ring-necked Duck.....	20.5	10.5	10	1.05—1
American Golden-eye.....	23	12	11	1.09—1
Bufflehead	13	8.5	4.5	1.88—1
Ruddy Duck.....	41	28.5	12.5	2.88—1
	<u>1001.5</u>	<u>599.5</u>	<u>402</u>	<u>1.46—1</u>

TABLE 2. Breeding season population for the year 1937 as estimated from a count taken from May 2 until May 23.

Species	Total	Males	Females	Ratio	Standing
Mallard	118	73	45	1.62—1	Decrease 2%
Cadwall	4	2	2	1.00—1	Increase 14%
Widgeon	51	27	24	1.12—1	Increase 33%
Green-winged Teal.....	73	42	31	1.35—1	Increase 175%
Blue-winged Teal.....	145	78	67	1.16—1	Increase 150%
Shoveller	61	32	29	1.10—1	Increase 306%
Pintail	75	44	31	1.41—1	Increase 80%
Redhead	61	31	30	1.03—1	Increase 65%
Canvas-back	133	76	57	1.33—1	Increase 4%
Lesser Scaup.....	267	163	104	1.56—1	Decrease 40%
Ring-necked Duck.....	14	8	6	1.33—1	Decrease 33%
American Golden-eye.....	20	11	9	1.22—1	Decrease 13%
Bufflehead	27	17	10	1.70—1	Increase 106%
Ruddy Duck.....	56	39	17	2.29—1	Increase 34%
	<u>1105</u>	<u>643</u>	<u>462</u>	<u>1.39—1</u>	<u>Increase 13%</u>

The relatively large increases in some of the later arriving ducks must not be considered as an actual increase over former years because as stated during the present season (1937) the count was started several days later and continued several days longer in the spring. This delay enabled these species to appear in Table 2 in more approximately their real position. The striking feature is the decline in the numbers of Lesser Scaups. This decrease may have been due to a movement farther north than during previous years, but this is only a conjecture as the brood count taken later in the summer (see Tables 6 and 7) showed a corresponding decrease. If, then, the increase of thirteen per cent is closely analyzed, it will be found that there has been no actual increase and possibly a decline. The increase in later arriving species, which have been here every year, will not make up for the loss in Lesser Scaups. The count as a whole, however, shows most species standing up fairly well in this area, particularly the threatened Redheads and Canvas-backs. As mentioned before, this district is very favorable for breeding waterfowl but the surrounding country is poor and ducks are more scarce. If, then, the conditions were so much better here, and they may be considered so, a large increase or a concentration of birds could be expected. Such was not the case, the inference to be drawn is that the scarcity of ducks is greater than generally realized.

Other species of waterfowl were also present for a few days during transit, American and Red-breasted Mergansers, and White-winged Scoters. These birds do not breed in this district and consequently were not included. The Greater Scaup, also, has been noted on rare occasions.

The sex ratio does not agree with that as given by some authorities. These records were derived from fewer numbers but taken from potential breeding birds in their breeding territories.

Many of the Mallards and Pintails had mated before they arrived in the early spring and it was only a very few days before they had established nests. Other species appeared to spend considerable time in pairs before actually nesting. This was particularly noticeable with the Lesser Scaups and the Ruddy Ducks.

NESTING DATA

During 1937 histories of sixty-seven nests were obtained and compared with the histories of forty-one nests for 1935.

TABLE 3. Summary of hatched and destroyed nests for seasons 1937 and 1935.

Species	Nests	SEASON 1937		SEASON 1935		
		Hatched	Destroyed	Nests	Hatched	Destroyed
Mallard	18	14	4	15	11	4
Green-winged Teal.....	....	....	....	1	0	1
Blue-winged Teal.....	9	5	4	1	0	1
Pintail	1	1	0	1	1	0
Shoveller	2	1	1	....	....	....
Redhead	3	2	1	2	1	1 (lost)
Canvas-back	26	22	4	14	12	2
Lesser Scaup.....	3	3	0	1	1	0
Ring-necked Duck.....	1	0	1	....	....	....
American Golden-eye..	....	....	....	1	1	0
Bufflehead	1	1	0	....	....	....
Ruddy Duck	3*	1	1	5	3	2
	—	—	—	—	—	—
	67	50	16	41	30	11

Percentage of hatch: 1937 = 74.33%; 1935 = 73.17%.

*One nest of a Ruddy Duck eventually turned into a community affair.

The agencies of destruction and the percentage of each for the two years are listed in Table 4.

TABLE 4. Agencies of destruction and percentage of each on nests under observation.

Agent	Nests destroyed		Nests destroyed	
	1935	Per Cent 1935	1937	Per Cent 1937
Crow	3	7.50	6	9.09
Skunk .....	....	....	5	7.59
Deserted	7	17.50	2	3.03
Fire	1	2.50	....	....
Cattle .....	....	....	1	1.53
Unknown causes.....	1	2.50	2	3.03

Fifteen per cent of the total nests were parasitized by other ducks. This was most noticeable with the Redheads and Canvas-backs. The large number of desertions during 1935 may have been partly due to parasitization. Two Mallard nests contained eggs of other ducks (Lesser Scaup and Mallard). Five Canvas-back nests contained either other Canvas-back or Redhead eggs. One contained seventeen eggs of which only eight hatched. Another Redhead's nest contained fifteen Redhead eggs of which nine hatched. Several platforms were found in the dense stands of *Typha* containing several Redhead eggs. One Ruddy Duck nest eventually turned into a community nest with eleven eggs.

The extent of Crow destruction was far less than was at first expected. This may be partly due to the fact that there are far fewer

Crows here than are to be found in a more open type of country to the south. As previously mentioned, the nests were noted as to concealment, judged of course from human standards. With the classification of either "well-concealed" or "open" there appeared to be no difference in the amount of destruction by Crows, one group being destroyed as readily as the other. One nest of a Mallard was built in such a dense mass of lodged growth that the female had difficulty in extricating herself when flushed. This nest was subsequently destroyed by Crows. In marsh growth the Crow seems to work best when the lodged *Typha* or *Scirpus* enables them to walk and climb about, while if the growth is new or standing there appears to be little or no destruction.

During 1935 and 1937 nine Marsh Hawks' nests were found and a close watch kept on the young after hatching to determine if any young ducklings were being fed to them. Several visits to each nest failed to reveal any evidence to indicate that such may have happened.

Around one slough were found three Mallard's nests, one Marsh Hawk's nest, and one Crow's nest, all within a radius of fifty yards. All nests of the Mallards, the Marsh Hawk, and the Crow were successfully hatched. Other instances of close nesting could be related and in each case the duck's nest was successfully terminated.

The season of 1937 witnessed a large increase in the number of skunks and the very low water levels of late June and early July enabled these predators to forage around and destroy nests of Redheads, Canvas-backs, and Ring-necked Ducks.

The average egg clutches, determined by completed sets, for the two years are listed under Table 5.

TABLE 5. Egg sets for seasons 1935 and 1937.

Species	No. nests	Largest set	Smallest set	Average set
Mallard	31	11	5	8.56
Blue-winged Teal.....	9	12	9	10.20
Shoveller	1	9	9	9.00
Pintail	2	8	7	7.50
Redhead	3	10	9	9.33
Canvas-back	38	10	5	7.38
Lesser Scaup.....	4	11	9	9.66
Ring-necked Duck.....	1	9	9	9.00
Bufflehead	1	5	5	5.00
Ruddy Duck.....	6	8	2	6.00

Although there were certain indications pointing to the fact that some of the earlier nesting ducks may have had a second attempt at nesting, nothing definite could be proved.

BROOD DATA

The brood census taken during the third week in July revealed a decrease of 48.86 per cent in the number of broods when compared with the average for the years 1934 and 1935. This remarkable decline could not be attributed to any known cause unless it was the result of the extreme heat and drought of early July, or the fact that there was a decrease in breeding stock previously mentioned.

Tables 6 and 7 show the information obtained from this census and a comparison with the average of previous years.

TABLE 6. Brood census information averaged for the years 1934 and 1935.

Species	Ave. No. broods	Ave. No. per brood	Smallest brood	Largest brood	Ave. total young	Percentage of total young
Mallard	7.50	5.80	2	8	42	5.70
Wigeon	6.00	6.21	2	9	36.5	4.99
Green-winged Teal.....	1.50	4.75	2	7	7.50	1.00
Blue-winged Teal.....	16.00	7.21	3	10	115	15.91
Shoveller	4.00	7.26	5	11	30	3.98
Pintail	5.50	7.31	3	9	28.5	5.69
Redhead	4.00	6.20	4	9	26	3.43
Canvas-back	15.50	5.44	1	8	84.50	12.16
Lesser Scaup.....	24.00	8.42	1	15	180	24.83
Ring-necked Duck.....	.50	5.00	5	5	5	.01
American Golden-eye..	1.50	5.75	4	7	8	1.15
Bufflehead	1.50	4.51	3	6	7.50	1.08
Ruddy Duck.....	26.00	5.54	2	11	145.50	19.82
	110.50	6.50	1	15	718.50	99.75

TABLE 7. Brood census 1937 and comparison with number of broods for 1934-1935.

Species	No. broods	Ave. No. per brood	Smallest brood	Largest brood	Total young	Percentage total young	Brood standing with previous average
Mallard	7	5.85	3	7	41	11.42	Decrease 6.66%
Widgeon	4	5.20	2	8	21	5.84	Decrease 33.33%
Blue-winged Teal.....	19	4.89	1	9	93	25.90	Increase 18.75%
Shoveller	4	6.75	5	8	27	7.52	Same
Pintail	8	4.25	1	7	34	9.46	Increase 45.45%
Redhead	2	5.00	4	6	10	2.78	Decrease 50.00%
Canvas-back	11	6.27	2	9	69	19.22	Decrease 27.09%
Lesser Scaup.....	4	8.00	4	10	32	8.91	Decrease 83.33%
American Golden-eye..	1	9.00	9	9	9	2.50	Decrease 33.33%
Bufflehead	1	6.00	6	6	6	1.67	Decrease 33.33%
Ruddy Duck	5	3.40	1	5	17	4.73	Decrease 80.77%
	66	5.45	1	10	359	99.95	Decrease 48.86%

The earlier nesting ducks had the smaller broods as could be expected, while the later nesting scaups and teals had the larger. An indication of the percentage of mortality during the first five weeks

after hatching may be obtained by comparing the average egg clutch of Mallards, which runs (based on thirty-one nests) 8.56 and the average hatching date, June 15, with the average brood taken during the third week in July, which was 5.78 (based on twenty-two broods over a three-year period). Such a comparison indicates a mortality of thirty-two per cent for the first five-week period immediately following hatching. The same method will indicate the mortality, over the same period, for Canvas-backs, based on thirty-eight nests and forty-two broods, and runs 20.5 per cent.

SUMMARY

A general summary reveals that until the late summer of 1936 conditions on the whole were very satisfactory when compared with other points, even though there has been a gradual lowering of water levels during the last fifteen years. The last two summers, exceedingly hot and dry, have dried up breeding sloughs and potholes, and any advantage that this district had when compared with other surrounding areas has almost disappeared. The decrease in waterfowl due to such predators as Crows and Marsh Hawks seems, as far as this area is concerned, to be greatly exaggerated. The oft quoted statement that as conditions in southern Saskatchewan and the northern parts of the United States became unsuitable for waterfowl they migrated and nested farther north appears unproved. Even when conditions here were nearly normal and conditions elsewhere much worse, there was no new influx of birds. The total number of young birds decreased this year (1937) by fifty per cent and the broods by almost the same figure. The decrease in the numbers of Lesser Scaups in the spring census is reflected again in the decrease in broods. The severe drought throughout the southern portions of the Prairie Provinces will not be off-set by the halting conservation policies at present in force and continued open seasons.

PRINCE ALBERT, SASKATCHEWAN.